
HD74HC4017

Decade Counter/Divider

HITACHI

Description

The HD74HC4017 is a 5-stage divide-by-10 Johnson counter with ten decoded outputs and a carry-out bit. High-speed operation and spike-free outputs are obtained by use of the Johnson decade counter configuration.





The ten decoded outputs are normally low and go high only at their respective decimal time periods. A high signal on Reset R asynchronously clears the decade counter and sets the carry output and Y_0 high. With \overline{CE} low, the count is advanced on a low-to-high transition at C input. Alternatively, if C is high, the count is advanced on a high-to-low transition at \overline{CE} . Each decoded output remains high for one full clock cycle. The carry output is high while Q_0, Q_1, Q_2, Q_3 or Q_4 is high, then is low while Q_5, Q_6, Q_7, Q_8 or Q_9 is high.

Features

- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: $I_{CC}(\text{static}) = 4 \mu\text{A max}$ ($T_a = 25^\circ\text{C}$)

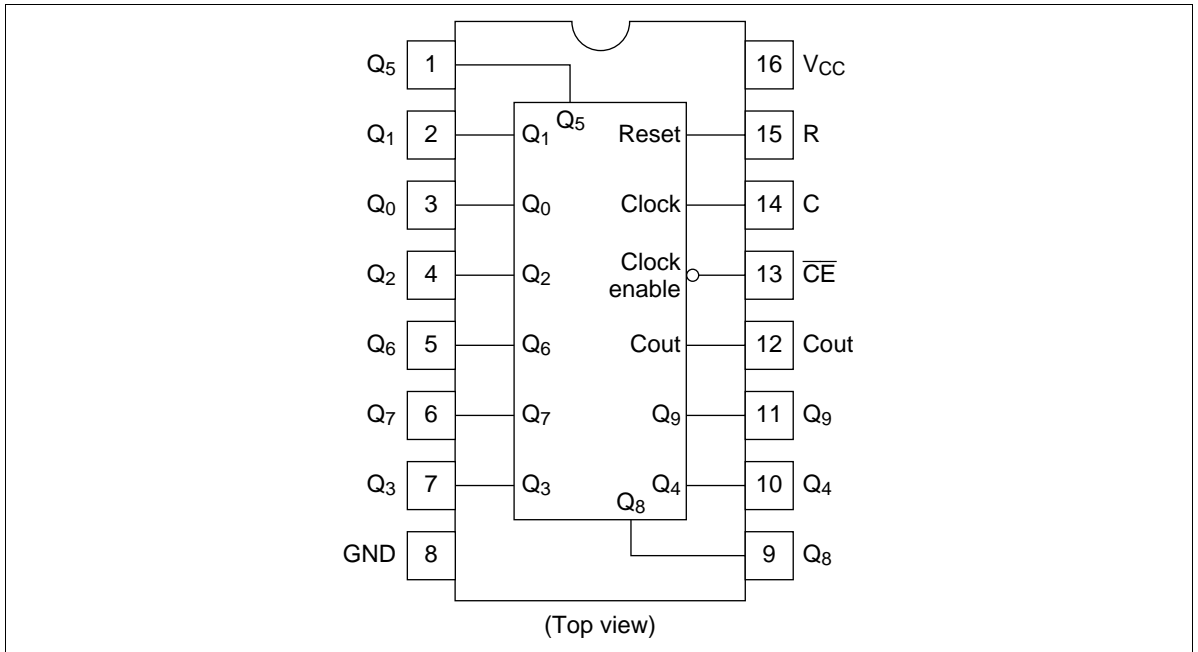
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Function Table

C	\overline{CE}	R	Decode Output = n
L	X	L	n
X	H	L	n
X	X	H	Q_0
	L	L	n + 1
	X	L	n
X		L	n
H		L	n + 1

- Notes: 1. X: Don't care
 2. If $n < 5$ Carry = "H", Otherwise = "L"

Pin Arrangement



DC Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V _{IL}	2.0	—	—	0.5	—	0.5			V
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V _{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA	
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I _{OH} = -4 mA
		6.0	5.68	—	—	5.63	—			I _{OH} = -5.2 mA
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL} I _{OL} = 20 μA	
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I _{OL} = 4 mA
		6.0	—	—	0.26	—	0.33			I _{OL} = 5.2 mA
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND	
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, I _{out} = 0 μA	

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Maximum clock frequency	f _{max}	2.0	—	—	6	—	5	MHz	
		4.5	—	—	31	—	27		
		6.0	—	—	36	—	31		
Propagation delay time	t _{PLH}	2.0	—	—	230	—	290	ns	C to Q
	t _{PHL}	4.5	—	20	46	—	58		
	t _{PHL}	6.0	—	—	39	—	49		

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AC Characteristics ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns) (cont)

Item	Symbol	V_{CC} (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min			Max
Propagation delay time	t_{PLH}	2.0	—	—	230	—	290	ns	C to Cout
	t_{PHL}	4.5	—	19	46	—	58		
		6.0	—	—	39	—	49		
	t_{PLH}	2.0	—	—	250	—	315	ns	\overline{CE} to Q
	t_{PHL}	4.5	—	21	50	—	63		
		6.0	—	—	43	—	54		
	t_{PLH}	2.0	—	—	250	—	315	ns	\overline{CE} to Cout
	t_{PHL}	4.5	—	20	50	—	63		
		6.0	—	—	43	—	54		
	t_{PLH}	2.0	—	—	230	—	290	ns	R to Q
	t_{PHL}	4.5	—	18	46	—	58		
		6.0	—	—	39	—	49		
	t_{PLH}	2.0	—	—	230	—	290	ns	R to Cout
	t_{PHL}	4.5	—	13	46	—	58		
		6.0	—	—	39	—	49		
Pulse width	t_w	2.0	80	—	—	100	—	ns	
		4.5	16	5	—	20	—		
		6.0	14	—	—	17	—		
Setup time	t_{su}	2.0	75	—	—	95	—	ns	
		4.5	15	5	—	19	—		
		6.0	13	—	—	16	—		
Hold time	t_h	2.0	50	—	—	65	—	ns	
		4.5	10	4	—	13	—		
		6.0	9	—	—	11	—		
Removal time	t_{rem}	2.0	100	—	—	125	—	ns	
		4.5	20	-3	—	25	—		
		6.0	17	—	—	21	—		
Output rise/fall time	t_{TLH}	2.0	—	—	75	—	95	ns	
	t_{THL}	4.5	—	6	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	Cin	—	—	5	10	—	10	pF	

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Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



*Dimension including the plating thickness
 Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DN
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EIAJ	Conforms
Weight (reference value)	0.15 g

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Hitachi, Ltd.

Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe GmbH
Electronic components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building, No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower, World Finance Centre,
Harbour City, Canton Road, Tsim Sha Tsui,
Kowloon, Hong Kong
Tel: <852> (2) 735 9218
Fax: <852> (2) 730 0281
Telex: 40815 HITEC HX

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